DEPARTMENT OF CONSUMER & INDUSTRY SERVICES
DIRECTOR'S OFFICE
CONSTRUCTION SAFETY STANDARDS

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(By authority conferred on the director of the department of consumer and industry services by sections 19 and 21 of Act No. 154 of the Public Acts of 1974, as amended, and Executive Reorganization Order No. 1996-2, being §§408.1019, 408.1021, and 445.2001 of the Michigan Compiled Laws)

R 408.40818 and R 408.40821 of the Michigan Administrative Code are effective as of the date of this amendment.

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PART 8. HANDLING AND STORAGE OF MATERIALS

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R 408.40801. Scope.

Rule 801. This part pertains to the handling and storage of construction materials, including care and use of slings, ropes, and chains for a construction operation, except for specific rules covering materials covered in Part 7. Welding and Cutting; Part 18. Fire Protection and Prevention; and Part 27. Blasting and Use of Explosives.

R 408.40817. Definitions.

Rule 817. (1) "Block" means a masonry unit having 1 dimension exceeding 15 inches, and 1 of its other 2 dimensions exceeding 7 inches.

(2) "Brick" means a masonry unit which is not a block.

(3) "Chain" means a series of metal links connected to, or fitted into, one another.

(4) "Lay" means the lengthwise distance required by a single strand to make 1 complete spiral around the rope.

(5) "Rigging equipment" means chain, wire rope, fiber rope, synthetic rope, sling, and their accessories and includes hoisting lines.

(6) "Rope" means a strand or series of strands of fiber, synthetic or wire braided, woven or twisted together.

R 408.40818. General provisions.

Rule 818. (1) Material shall be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling, or collapse during storage or transit.

(2) Before material is unloaded from a railcar or vehicle or removed from storage, the load or pile shall be examined to ascertain if the material has shifted, binders or stakes have broken, or the load or pile is otherwise hazardous to an employee. If a hazardous condition is found, an attempt shall not be made to remove the load until corrective measures are taken that will ensure the safety of the employee who is exposed to the hazardous condition.

(3) The maximum safe load limit in pounds per square foot of a floor or roof of a building shall be posted in all storage areas, except a slab on grade. The maximum safe load limit shall not be exceeded.

(4) Except for masonry and mortar, material shall not be stored within 4 feet (1.2m) of a working edge during overhand bricklaying or related work.

(5) Gravel, sand, and crushed stone shall be withdrawn from a pile or barrow area in a manner that prevents overhangs and vertical faces.

(6) Storage areas, aisles, and passageways shall be kept free of the accumulation of materials that constitutes a hazard to the movement of material-handling equipment and employees.

(7) If a difference in road or work levels exists, ramps, grading, or blocking shall be provided to ensure the safe movement of material-handling equipment.

(8) A railcar, truck, or semitrailer shall be chocked or otherwise secured during loading and unloading if the movement of a railcar, truck, or trailer could create a hazard for the employee.

(9) If in use, a dockboard or dock plate shall be secured against movement and shall have a slip-resistant surface.

(10) A load line shall not be wrapped around the material being lifted.

(11) A material shall not be stored with any other material with which it could react and cause a hazardous condition.

(12) While roofing work is being performed, materials and equipment shall not be stored within 6 feet (1.8m) of a roof edge, unless guardrails are erected at the roof edge.

(13) Materials that are piled, grouped, or stacked near a roof edge shall be stable and self-supporting.

R 408.40819. Storage of bagged material, brick, and block.

Rule 819. (1) The height of a manually stacked pile of bagged material, weighing more than 30 pounds per bag, shall not exceed 5 feet.

(2) Bagged material on a pallet shall:

(a) Be not more than 36 inches in height.

(b) Be secured to prevent displacement from the pallet before moving.

(c) Be stacked not more than 2 pallets high.

(3) A loose brick or tile stack shall:

(a) Be tapered back to 2 inches in every foot of height above 4 feet.

(b) Not exceed 6 feet in height.

(c) Be cross-keyed at each 2-foot level.

(4) A loose block stack shall:

(a) Not exceed 6 feet in height.

(b) Be cross-keyed at each 3-foot level.

(5) Brick on a pallet shall:

(a) Be not more than 30 inches in height.

(b) Be secured to prevent displacement from the pallet before moving.

(c) Be stacked not more than 2 pallets high.

(6) Block on a pallet shall:

(a) Be not more than 46 inches in height.

(b) Be cross-keyed every course or secured to pallet.

(c) Be stacked no more than 2 pallets high.

(7) Brick or block in a banded cube shall not be stacked more than 2 cubes high.

R 408.40820. Storage of lumber.

Rule 820. (1) Lumber shall be stacked on level and solidly supported sills so as to be self-supporting and stable.

(2) The width of a pile of lumber shall be no less than 1/2 the height.

(3) A pile of lumber manually stacked, and a pile of lumber to be manually unstacked, shall not exceed 6 feet in height.

(4) Lumber which is mechanically stacked shall not exceed 10 feet in height. This lumber shall not be re-handled manually, except as prescribed in subrule (3) of this rule.

(5) Used lumber shall have all protruding nails removed or bent into the lumber before stacking.

R 408.40821. Storage of material in bins or hoppers.

Rule 821. (1) A bin or hopper that has a bottom discharge shall have sloped sides to allow material to flow freely.

(2) A hopper shall have a top opening that is 42 inches or less above the ground or working surface and shall be equipped with grillwork over the opening which is capable of supporting any intended load and which has a mesh that is not more than 6 by 6 inches to prevent employee entry.

(3) An employee required to enter or work on stored material in a silo, hopper, bin, tank, or similar storage area shall be provided with fall protective equipment as prescribed in Part 45. Fall Protection, being R 408.44501 et seq. of the Michigan Administrative Code.

R 408.40822. Clearances.

Rule 822. (1) Material stored near an electrical distribution or transmission line shall maintain the following clearances:

(a) Line rated 50 kV or less — 10 feet plus length of material stored.

(b) Line rated 50 KV or more — 10 feet plus 0.4 for each 1 kV over 50 kV plus length of material stored.

(2) All equipment used to store material near energized electrical lines shall conform to Part 10. Lifting and Digging Equipment, and Part 13. Mobile Equipment.

(3) An employee shall be designated to observe the clearance and give timely warning if it is difficult for the operator to maintain the prescribed clearance by visual means.

(4) An employee storing or handling material shall not come closer than the prescribed clearances of subrule (1) of this rule.

R 408.40823. Compressed gas.

Rule 823. The handling and storage of all compressed gases, except those used for welding and cutting, shall be as prescribed in the Compressed Gas Association pamphlet, P-1-1974, Safe Handling of Compressed Gases in Containers, which is herein adopted by reference and may be inspected at the Lansing office of the department of consumer and industry services. This pamphlet may be purchased at a cost of $2.00 from the Compressed Gas Association, Inc., 500 Fifth Avenue, New York, New York 10036, or the Michigan Department of Consumer & Industry Services, 7150 Harris Drive, Box 30643, Lansing, Michigan 48909.

R 408.40831. Handling materials to be dropped.

Rule 831. (1) The area onto and through which material is to be dropped shall be completely enclosed with barricades not less than 36 inches or more than 42 inches high and not less than 6 feet back from the opening and area receiving the material. Signs warning of the hazard of falling materials shall be posted on the barricades at each level containing the barricades.

(2) If material is dropped through more than 1 level, the opening shall be enclosed between the upper and lower levels, or an enclosed chute provided, or the intermediate levels barricaded as prescribed in subrule (1) of this rule. If the drop is more than 40 feet inside a building, only an enclosed opening or chute shall be used. The chute or enclosure shall extend through the ceiling of the receiving level.

(3) A material chute shall be constructed to withstand any impact load imposed on it without failure.

(4) A material chute, or section thereof, at an angle of more than 45 degrees from the horizontal shall be entirely enclosed, except an opening may be provided at or about each floor level for insertion of materials. The opening shall not exceed 48 inches in height measured along the wall of the chute. At all stories below the top floor, the openings shall be kept closed if not in use.

(5) A material chute shall fit a floor or wall opening, or the space between the chute and the floor or wall opening shall be covered.

(6) If material is dumped from mechanical equipment or a wheelbarrow, a toeboard or bumper not less than 4 inches thick X 6 inches high nominal size shall be secured to the floor at each material chute opening.

(7) A gate capable of withstanding the load imposed on it shall be installed at or near the discharge end of a material chute. A trained employee shall be in charge of opening the gate and loading of trucks.

(8) If the drop is more than 20 feet outside the exterior of the building, a chute as prescribed in subrules (3) to (6) of this rule shall be used, and extend to within 8 feet of the lower level.

(9) Removal of material, barricades, and chutes shall not be permitted until material handling ceases above.

R 408.40832. Rigging equipment.

Rule 832. (1) Rigging equipment for material handling shall be inspected at the time of installation, before each job, and at the beginning of each shift if in use, by an employee qualified to perform this inspection. Defective rigging equipment shall be removed from service.

(2) If not in use, rigging equipment shall be stored in a manner which is not hazardous for an employee.

(3) Rigging equipment, other than a sling, hoisting line, and alloy steel chain, shall have a safety factor of not less than 5, and shall not be used in excess of its rated capacity.

R 408.40833. Slings.

Rule 833. (1) All slings used to store or handle material for construction operations shall meet the requirements of Part 49. Slings, being R 408.14901 et seq. of the Michigan Administrative Code, with the exception of R 408.14935.

(2) A job-built wire rope sling shall:

(a) Have eyes formed by the use of the proper number of U-bolt wire rope clips, as required by table 1, which are installed as prescribed in R 408.40834(4).

(b) Have each eye equipped with a thimble where the short axis of the eye is 4 times the wire rope diameter or less.

(c) Be proof tested to 125% of the maximum intended load prior to use.

R 408.40834. Wire ropes.

Rule 834. (1) Wire rope shall be taken out of service if any of the following conditions exist:

(a) In running ropes, 6 randomly distributed broken wires in 1 lay or 3 broken wires in 1 strand in 1 lay.

(b) Wear of 1/3 the original diameter of outside individual wires. Kinking, crushing, bird-caging, or any other damage resulting in distortion of the rope structure, except for deformation caused by normal methods of attachment to drums, hooks, shackles, or other accessories.

(c) Evidence of any heat damage from any cause.

(d) Reductions from nominal diameter of more than 1/64-inch for diameters up to and including 5/16-inch, 1/32-inch for diameters 3/8-inch to and including 1/2-inch, 3/64-inch for diameters 9/16-inch to and including 3/4-inch, 1/16-inch for diameters 7/8-inch to 1-1/8-inches inclusive, 3/32-inch for diameters 1-1/4 to 1-1/2 inches inclusive.

(e) In standing ropes, more than 2 broken wires in 1 lay in sections beyond end connections or more than 1 broken wire at an end connection.

(2) The defective portion of a wire rope and any areas of deformation caused by normal methods of attachment of a wire rope, removed as provided for in subrule (1) of this rule, shall not be used for other load carrying service.

(3) A wire rope used for hoisting, lowering, or pulling shall consist of 1 continuous piece without a knot or splice, except an eye splice at the end of a wire rope.

(4) If wire rope clips are used to form eyes in a wire rope, table 1 shall be followed as to numbers and spacing to be used. The “U” section shall be on the dead end side.

(5) An eye splice made in any wire rope shall have not less than 4 full tucks.

(6) A wire rope eye shall be equipped with a thimble if the eye is placed over or around an object with a sharp corner.

(7) Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

(8) Table 1 reads as follows:

TABLE 1

NUMBER AND SPACING OF U-BOLT WIRE ROPE CLIPS

Improved plow steel rope diameter inches	*Number of clips*		*Minimum Spacing (inches)*
	Drop forged	*Other material*	
1/2 or less	3	4	3
5/8	3	4	3-3/4
3/4	4	5	4-1/2
7/8	4	5	5-1/4
1	5	6	6
1-1/8	6	6	6-3/4
1-1/4	6	7	7-1/2
1-3/8	7	7	8-1/4
1-1/2	7	8	9

R 408.40835. Natural and synthetic fiber rope; specifics.

Rule 835. (1) A natural or synthetic fiber rope used for hoisting, lowering, or pulling shall consist of 1 continuous piece without a knot or splice, except an eye splice at the end of the rope.

(2) An eye splice for manila rope shall contain not less than 3 full tucks.

(3) An eye splice for stranded synthetic fiber rope shall contain not less than 4 full tucks. An eye splice for other types of synthetic fiber rope shall be made as prescribed by the rope manufacturer.

(4) An eye splice for natural or synthetic fiber rope shall be of a size to provide an interior angle at the splice of not more than 60 degrees when the eye is in place.

(5) A natural or synthetic fiber rope eye shall be equipped with a thimble if the eye is placed over or around an object with a sharp corner.

(6) Strand end tails from an eye splice shall not be trimmed flush with the surface of the rope adjacent to the full tucks. Tails from an eye splice for a fiber rope less than 1-inch in diameter shall project not less than 6 rope diameters beyond the last full tuck. Tails from the eye splice for fiber rope 1-inch or more in diameter shall project not less than 6 inches beyond the last full tuck. Projecting tails may be tapered and spliced into the body of the rope using not less than 2 additional tucks, or they may be taped or wired down.

(7) A natural or synthetic rope shall not be used for load carrying service if:

(a) It is frozen or has been subjected to corrosive chemicals or extreme temperatures.

(b) It has begun to unravel.

(c) It has external abrasions, cuts, or broken fibers, decay, burns, softness, or variation in size or roundness.

(d) It has internal presence of grit, broken fibers, mildew or mold, color change, powdering, or loose fibers.

(8) Natural or synthetic rope shall not be used if there is exposure to corrosive substances, chemicals, or heat.

R 408.40836. Hooks, shackles, and other accessories.

Rule 836. (1) A hook shall have a rated capacity equal to the chain or rope to which it is attached, and the load shall not exceed the rated load. Shackles and other accessories shall have a rated capacity equal to or greater than the load to which it is attached.

(2) A hook shall be discarded if:

(a) The throat opening is more than 15% greater than the manufactured size.

(b) The hook has more than 10 degrees twist from a vertical center line drawn through the hook center.

(3) A closed hook shall be used if there is a probability of the load becoming disengaged.

(4) Special custom designed grabs, hooks, clamps, and other lifting accessories, for such units as modular panels, prefabricated structures and similar materials, shall be marked to indicate the safe working loads and shall be proof tested to 125% of their rated load.

(5) A job or shop hook and link, or a makeshift fastener, formed from a bolt, rod, or other such accessories, shall not be used, unless tested in accordance to subrule (4) of this rule.

(6) A shackle and connecting pin, and other accessories, shall be discarded if the diameter is reduced by more than 10%.

R 408.40837. Chains.

Rule 837. (1) Chains used for material handling shall be made of alloy steel.

(2) An alloy steel chain shall have a permanently affixed tag showing the size, grade, rated capacity, and manufacturer's name.

(3) If wear at any point of any chain link is more than that shown in table 2, the chain shall be repaired or replaced. The repair shall return the chain to its rated capacity.

(4) A load-carrying chain shall be repaired only by the manufacturer.

TABLE 2

MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Chain Size (Inches)	*Maximum Allowable Wear (Inch)*
1/4	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/16
1-1/8	7/32
1-1/4	1/4
1-3/8	9/32
1-1/2	5/16
1-3/4	11/32

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